

Feature Saliency in a Discrimination Task

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Different features of a visual stimulus are salient to different species, with work largely focusing on pigeons and primates: species where vision is the dominant sense. Dogs are a commonly used model in cognitive studies, however, there has been little investigation into their visual perception and the relative saliency of different stimulus features. This study presented 5 dogs with a visual discrimination task using a two-alternative forced choice procedure on a touchscreen apparatus. The positive and negative stimuli differed in 2 dimensions for each condition. Stimulus features in the different conditions were as follows: A) Pattern and shape, B) Shape and size C) Pattern and size. For each condition dogs were allocated 2 positive (rewarded) and 2 negative (non-rewarded) stimuli. Order of condition and assignment of positive vs negative stimuli were counterbalanced across dogs. After the dogs had reached criterion for their training stimuli they were presented with a feature mismatch test to investigate which cues were of greater saliency to them. Test stimuli comprised a combination of positive and negative stimulus features, e.g., in condition B, positive shapes were presented in negative sizes and negative shapes were presented in positive sizes. Following the initial tests, the dogs received a second set of test trials in which the positive and negative stimulus features were presented in isolation, e.g. original shapes but a novel size and original size but a novel shape. All dogs were able to learn the discrimination in all conditions. The results of the feature mismatch test revealed that dogs preferentially used pattern over shape and size, but when pattern wasn't present they used size over shape. Examination of the tests which presented features alone revealed individual differences. This is the first study to investigate feature saliency in dogs. It demonstrates that they share some preferences with other species e.g. pigeons favour texture over shape. This is interesting in evolutionary terms given the differences in their visual systems. Additionally reduced saliency of shape compared to humans shows interesting interspecies differences. This is of relevance when people select training stimuli for the investigation of cognitive function or the training of working dogs, and has welfare implications (e.g., asking dogs to discriminate shape under reward/punishment conditions).

Keywords

visual discrimination, touchscreen, dog